AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (currently amended) A waveguide for use with an antenna aperture for forming a transition region for channeling electromagnetic wave signals, the waveguide comprising:

a tubular waveguide component having a tapering inner surface;

a dielectric member having a predetermined length and a generally conical profile, and inserted at least substantially into the tubular waveguide component to be at least substantially housed therein, the dielectric member having a base portion having a diameter about equal to an opening in the tubular waveguide component in which the base portion is inserted; and

wherein at least one of said dielectric member and said tapering inner surface comprises a surface that is non-linear.

2. (original) The waveguide for claim 1, wherein the dielectric member is comprised of a plurality of linear sections forming said generally conical profile;

3. (original) The waveguide of claim 1, wherein the tapering inner surface comprises a plurality of adjacently formed linear surface sections.

4. (original) The waveguide of claim 1, wherein the generally conical profile of said dielectric member comprises a gradually curving surface.

5. (original) The waveguide of claim 1, wherein the tapering inner surface of the tubular waveguide component comprises a gradually curving inner surface.

6. (original) The waveguide of claim 1, wherein the dielectric member is disposed concentrically within said tubular waveguide component.

7. (original) The waveguide of claim 1, wherein said dielectric member has a non-linear outer surface and said tubular waveguide component has a non-linear inner surface.

8. (cancelled)

9. (currently amended) A waveguide comprising:

a tubular waveguide member having a tapering inner wall, said tapering inner wall forming a generally linear surface;

a generally conically shaped dielectric member disposed within said tubular waveguide;

wherein said generally conically shaped dielectric member includes an outer surface that is non-linear over a length thereof; and [[.]]

the dielectric member having a base portion having a diameter that is about equal to an opening in said tubular waveguide member in which said base portion is inserted.

10. (original) The waveguide of claim 9, wherein said outer surface of said dielectric member comprises a plurality of distinct linear sections formed adjacent one another to form said non-linear outer surface.

11. (original) The waveguide of claim 9, wherein said outer surface of said dielectric member comprises a smoothly curving outer surface.

12. (currently amended) A waveguide comprising:

a tubular waveguide member having a tapering inner wall, said tapering inner wall forming a non-linear surface;

a generally conically shaped dielectric member disposed within said tubular waveguide;

~~wherein~~ said generally conically shaped dielectric member ~~includes~~ including an outer surface that is linear over a length thereof[[.]] ; and

said dielectric member including a base portion having a diameter that is about equal to an opening in said tubular waveguide member in which said base portion is inserted.

13. (original) The waveguide of claim 12, wherein said tapering inner wall of said tubular waveguide member comprises a plurality of distinct linear sections forming said non-linear shape.

14. (original) The waveguide of claim 12, wherein tapering inner wall of said tubular waveguide member comprises a smoothly curving surface.

15. (original) The waveguide of claim 12, wherein said dielectric member is disposed concentrically within said tubular waveguide member.

16. (currently amended) An antenna comprising:

an aperture;

a waveguide in electromagnetic wave communication with said aperture;

said waveguide including:

a tubular member having a tapering inner wall surface;

a dielectric insert having an outer surface and a base portion, and disposed at least substantially within said tubular member; ~~and~~

~~wherein~~ at least one of said tapering inner wall surface and said outer surface of said dielectric insert has a non-linear shape over a length thereof; and said base portion having a diameter about equal to that of an opening in said tubular member in which said base portion is inserted.

17. (original) The antenna of claim 16, wherein said tapering inner wall surface of said tubular member comprises a smoothly curving shape.

18. (original) The antenna of claim 17, wherein said outer surface of said dielectric insert comprises a linear surface.

19. (original) The antenna of claim 17, wherein said tapering inner wall surface of said tubular member comprises a plurality of distinct linear sections forming an overall non-linear profile.

20. (original) The antenna of claim 16, wherein said outer surface of said dielectric insert comprises a smoothly curving shape.

21. (original) The antenna of claim 20, wherein said tapering inner wall surface of said tubular member comprises a linear surface.

22. (original) The antenna of claim 16, wherein said outer surface of said dielectric insert comprises a plurality of distinct linear sections to form an overall non-linear, conical shape.

23. (original) The antenna of claim 22, wherein said tapering inner wall surface of said tubular member comprises a linear surface.

24. (original) The antenna of claim 16, wherein said dielectric member has a non-linear outer surface and said inner surface of said tubular waveguide component is non-linear.

25. (currently amended) A method of channeling electromagnetic wave energy comprising:

forming a waveguide by disposing a dielectric insert within a tubular waveguide member; ~~and~~

forming one of an outer surface of said dielectric insert, and an inner surface of said tubular waveguide member with a non-linear shape; and [[.]]

forming said dielectric insert with a base portion that is about equal in diameter to an opening in one end of the tubular waveguide member in which said base portion is inserted.

26. (original) The method of claim 25, further comprising disposing said dielectric insert concentrically within said tubular waveguide member.

27. (original) The method of claim 25, further comprising forming one of said outer surface of said dielectric insert and said inner surface of said tubular waveguide with a gradually curving, conical shape.

28. (original) The method of claim 25, further comprising forming one of said outer surface of said dielectric insert and said inner surface of said tubular waveguide with a plurality of distinct linear sections disposed adjacent one another to form an overall, non-linear surface.

29. (cancelled)

30. (cancelled)

31. (cancelled)

32. (cancelled)

33. (cancelled)

34. (cancelled)

35. (cancelled)

36. (currently amended) A phased array antenna comprising:

a plurality of apertures; and

a plurality of waveguides in electromagnetic wave communication with said apertures;

wherein each of said waveguides includes:

a tubular member having an tapering inner wall surface and an opening at one end; and

a dielectric insert having an outer surface disposed at least substantially within said tubular member, and a base portion inserted into said opening; and

wherein at least one of said tapering inner wall surface and said outer surface of said dielectric insert has a non-linear shape over a length thereof, and said base portion has a diameter about equal to said opening.

37. (cancelled)

38. (currently amended) A waveguide for an antenna system, comprising:

means for defining a cut-off frequency threshold of the waveguide by controlling a geometry of a tubular waveguide component relative to a dielectric insert disposed within the tubular waveguide component, where the dielectric insert has a base portion having a diameter about equal to an opening in the tubular waveguide component into which the base portion is inserted.